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or smaller semiconductor devices. Improved or smaller semiconductor devices may be accomplished by reducing leakage and increasing the dielectric constant."

In the Claims

1. (Amended) A method of forming a dielectric layer on a semiconductor device comprising:

- providing a substrate having at least one semiconductor layer;
- forming a first conductive layer over at least a portion of the substrate;
- depositing a silicon-containing material from a silicon source on the first conductive layer;
- forming the dielectric layer by processing the deposited silicon-containing material with a reactive agent selected to react with silicon atoms of the deposited silicon-containing material; and
- forming a second conductive layer over the dielectric layer.

5. (Amended) The method of claim 1, wherein the reactive agent is selected from the group comprising NH_3 , N_2 , O_2 , O_3 , N_2O and NO .

12. (Amended) A method of forming a dielectric layer comprising:

- providing a substrate having at least one semiconductor layer;
- vapor depositing a silicon-containing material from a self limiting silicon source on at least a portion of the substrate, wherein said portion of said substrate is conductive; and
- forming the dielectric layer by processing the silicon-containing material in a reactive ambient at a processing temperature, a processing time and a processing pressure selected to result in a desired dielectric constant and leakage characteristics.

26. (Amended) A method of forming a dielectric layer comprising:

- providing a substrate having at least one semiconductor layer;